



I++DME Interoperability

Interoperability

Improving I++DME Deployment. A vendor's perspective.

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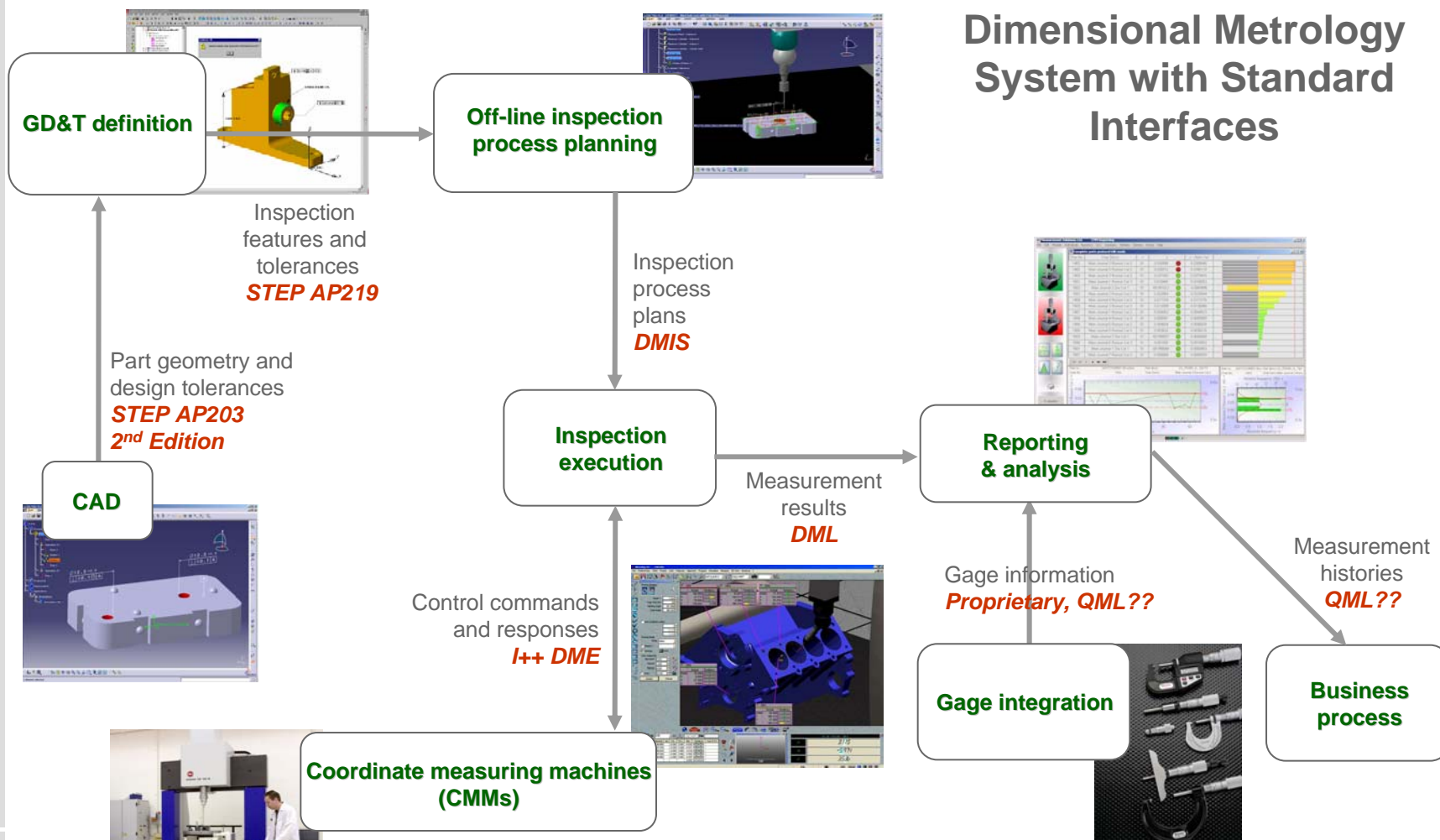
I++DME Interoperability

History

- Focus has been on designing system interfaces.



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Benefits

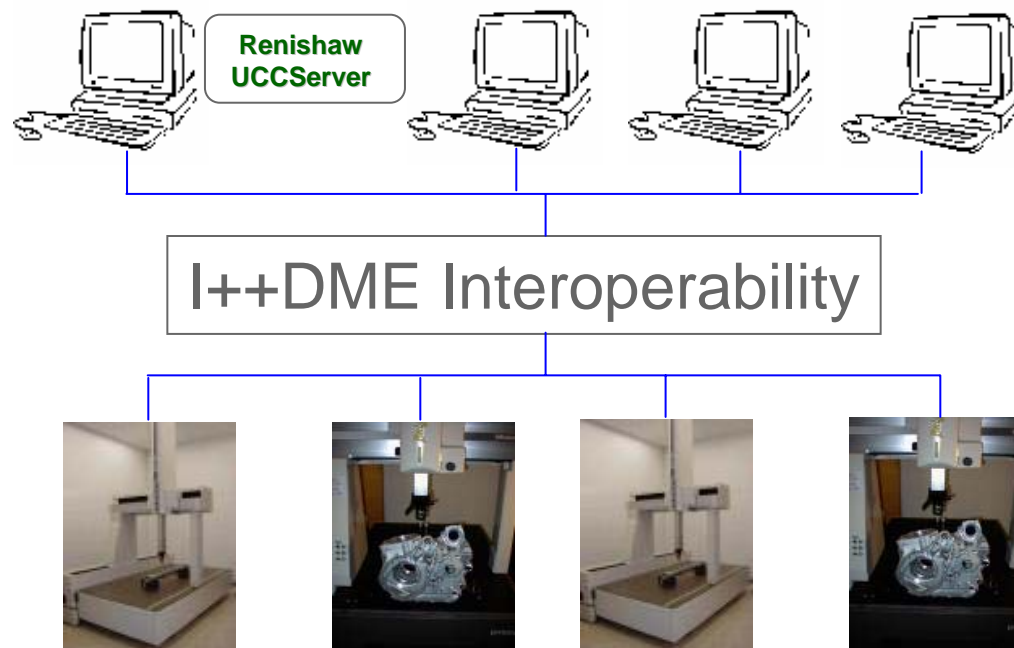
- Designing system interfaces has helped to:
 - Increase operating efficiency and user productivity.
 - Reduce part re-programming as user's move between CMMs.
 - Reduce training costs.
 - Allow best of breed purchases.
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Issue

- While I++ allows different programming programs (CLIENTS) & diverse execution programs (SERVERS) to communicate to CMMs..

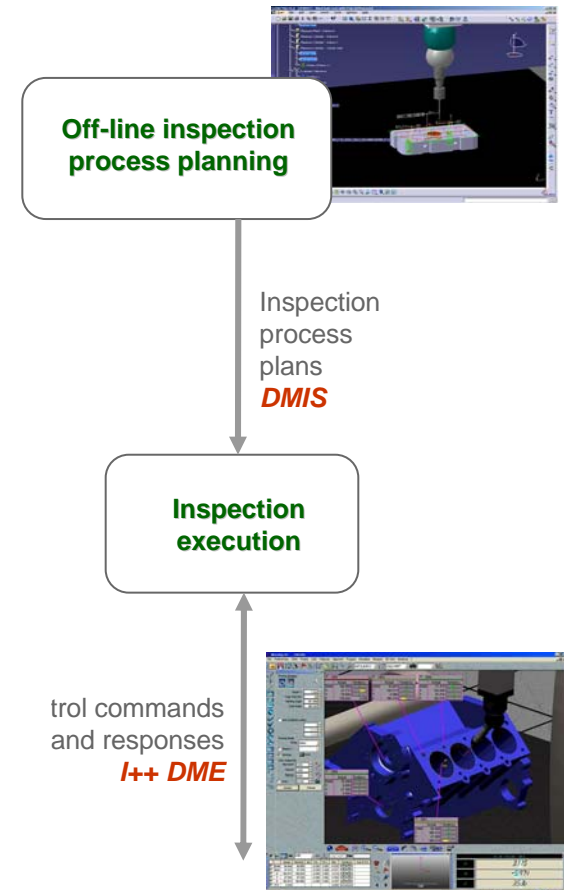


- More can still be done - especially between CLIENTS and SERVERS.



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- Interoperability on the shop floor is not only about metrology operation.
- Client developers and end-users are now requesting the ability for the server and client to share a common description of the DME environment.
- Although the export of tool-assembly information is listed as an unscheduled extension in I++DME v1.5 we believe this should now be dealt with as a matter of priority.





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I++DME Environment

- Consists of:
 - CMM table
 - Rotary table
 - Racks
 - Heads
 - Calibration parts
 - Tool definitions

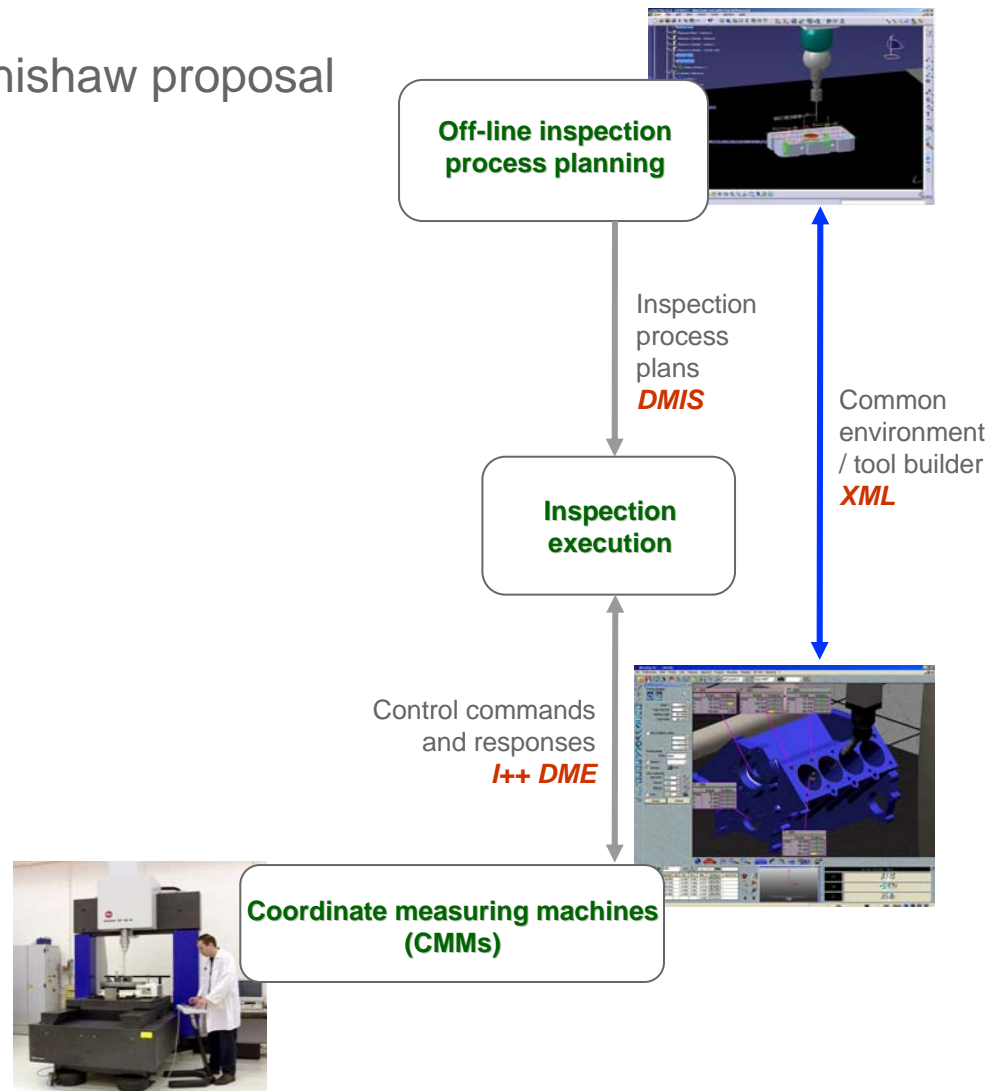
Why share?

- Server(s) clearly need this information.
- Client(s) also need the same information for visualisation, simulation and enhanced collision detection.
- The problem is that the same information needs to be entered into both the client and the server.
- Duplication of data = **mistakes**.
- Duplication of effort = **waste of time and unnecessary cost**.



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Renishaw proposal



Dimensional Metrology System with an Extended Interface

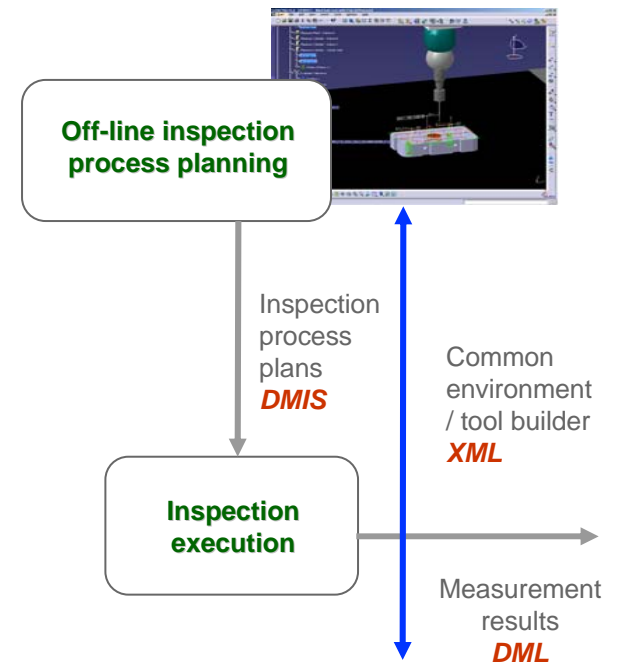
A new method of transferring the DME environment data between the server and client.



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Renishaw proposal

- To define an XML schema to allow a complete I++DME environment definition.
- This includes extending component properties to include:
 - Position
 - Orientation
 - The geometry described in primitives
 - VRML models (or other 3D open file formats) for display purposes.
- QUESTION: Is it possible to extend the DML interface schema?





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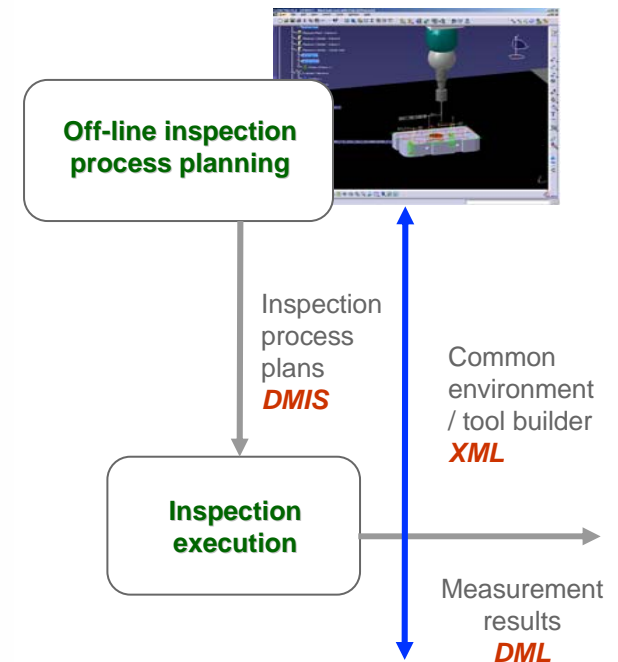
DML interface schema

- Is used for results but shares some commonalties.
- If not appropriate to use DML create a separate schema.

```

<xs:documentation>Used to record the measured information for a closed_slot
feature.</xs:documentation>
</xs:annotation>
- <xs:sequence>
  <xs:element name="center_point" type="center_pointType" />
  <xs:element name="axis_vector" type="axis_vectorType" />
  <xs:element name="length_vector" type="length_vectorType" />
  <xs:element ref="width" />
  <xs:element ref="width_min" minOccurs="0" />
  <xs:element ref="width_max" minOccurs="0" />
  <xs:element ref="length" />
  <xs:element ref="length_min" minOccurs="0" />
  <xs:element ref="length_max" minOccurs="0" />
  <xs:element ref="depth" minOccurs="0" />
  <xs:element name="normal" type="normalType" minOccurs="0" />
  <xs:element ref="offset" minOccurs="0" />
  <xs:element name="report_data_list" type="report_data_listType" minOccurs="0" />
</xs:sequence>
<xs:attributeGroup ref="featureAttGroup" />
</xs:complexType>
- <xs:complexType name="closed_slot_feature_nominalType">
  - <xs:annotation>
    <xs:documentation>Used to define the nominal information for a closed_slot
    feature.</xs:documentation>

```





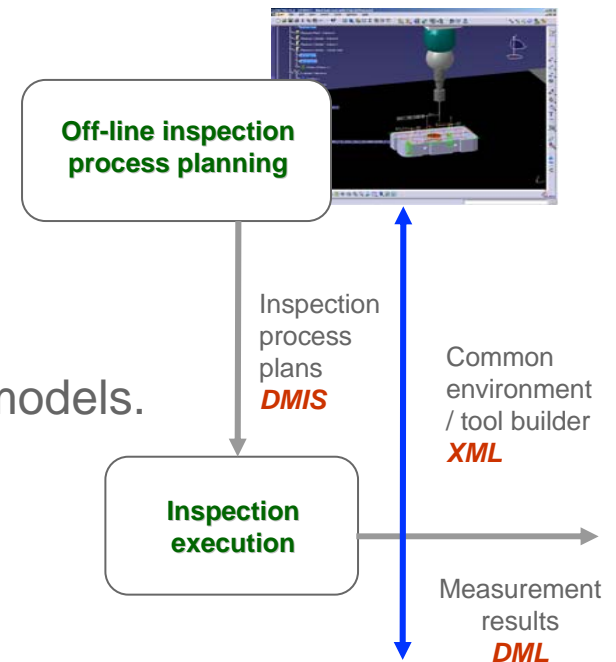
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DML interface schema

- Initially envisaged as a 'push' from the server(s) to the client(s).
- Less server(s) to contend with.
- Longer term could work either way - I.e. from client to server as well.
- Important to focus on the schema interface.
- Who sends or receives should be irrelevant.

Benefits

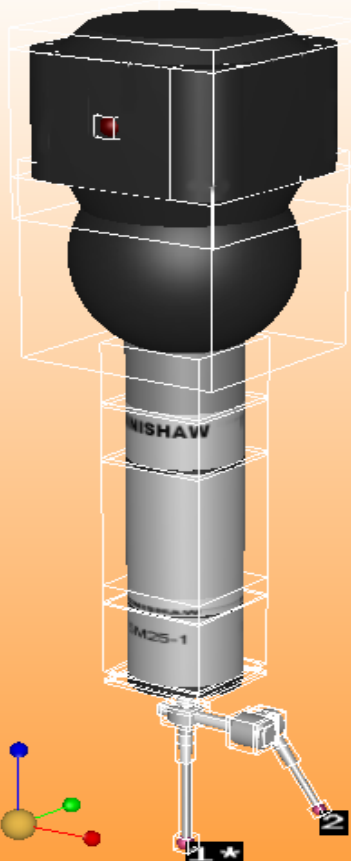
- Avoid duplication.
- Saves time and money.
- + More definable accurate collision avoidance models.



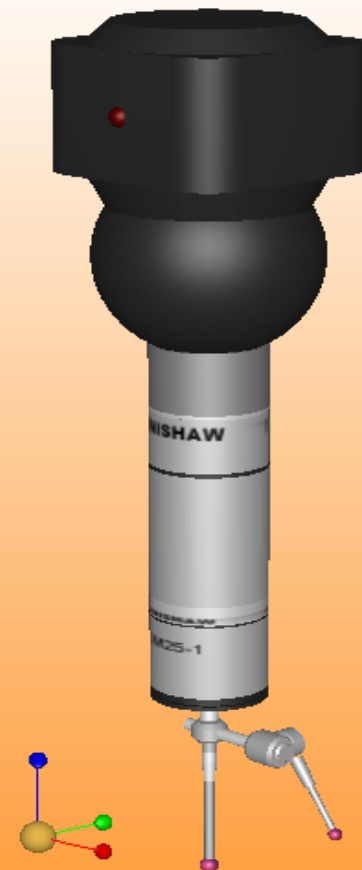


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- More definable accurate collision avoidance models.



Using models that more accurately reflect probe geometry could replace current box volumes which some times are too coarse for accurate collision checking.





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Benefits

- All client applications currently manage the DME environment. In installations where a single client is used with multiple servers having to training operators in the use of the server user interfaces is seen as a negative.
- A common XML schema could help minimise this complaint.

Potential pitfalls

- Is XML the right mechanism?
-



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Next steps

- A working group could be tasked with investigating this proposal and the additional benefits it might bring.
- This group could exist within the I++ group.
- Renishaw could organise a meeting if desired.
- Renishaw currently hosts the I++DME website
 - <http://www.iplusplusdme.org>
- This could be extended to cover the design of the new schema.
- Extension could include incorporation of Phixus™





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Phixus™

- Phixus is powerful task / change management software built and used by Renishaw.
- We could implement this within the I++DME site for the management of the creation of the new XML schema.





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Finally

- The I++ web site could be extended to hold libraries of probe geometry for all tables, racks, heads, styli etc.
 - Renishaw could provide assistance and expertise to the I++ group to build an auto-update mechanism for such geometry such that all client(s) / server(s) could obtain this automatically from a bona fide standard repository.
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Thank you.

